The opinion in support of the decision being entered today is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte ANDREAS N. DORSEL, KYLE J. SCHLEIFER, ELECIA C. WHITE, CHARLES S. LADD, and DEBRA A. SILLMAN

Appeal 2007-1132
Application 10/036,999
Technology Center 1600

Decided: September 18, 2007

Before TONI R. SCHEINER, DONALD E. ADAMS, and ERIC GRIMES, *Administrative Patent Judges*.

ADAMS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal under 35 U.S.C. § 134 involves claims 1-5, 7-11, and 18-20, the only claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

INTRODUCTION

Claims 1, 5, and 7 are illustrative:

1. A method comprising:

(a) scanning an interrogating light across multiple sites on an array package including an addressable array of multiple biopolymeric features of different moieties, which scanned sites include multiple features of an array;

(b) detecting signals from respective scanned sites emitted in response to the interrogating light; and

(c) decreasing power of the interrogating light for a first site on the array package during the scanning wherein the first site is outside an area occupied by the array.

5. A method comprising:

(a) scanning an interrogating light across multiple sites on an array package including an addressable array of multiple biopolymeric features of different moieties, which scanned sites include multiple features of the array;

(b) detecting signals from respective scanned sites emitted in response to the interrogating light; and

(c) altering power of the interrogating light for a first site on the array package during scanning;

wherein the first site is an array feature; and

wherein the interrogating light power is altered based on the signal emitted from the first site, when the interrogating light initially illuminates the first site.

7. A method comprising:

(a) prior to scanning an interrogating light across an array package, calibrating an interrogating light power versus a control signal characteristic

from a light system which provides the interrogating light of a power which varies in response to the control signal characteristic;

(b) following step (a), scanning the interrogating light across multiple sites on an array package including an addressable array of multiple biopolymeric features of different moieties, which scanned sites include multiple features of the array;

(c) detecting signals from respective scanned sites emitted in response to the interrogating light; and

(d) altering the interrogating light power for a first site on the array package during the array scanning using the calibration of step (a), based on location of the first site or on a determination that the emitted signal from the first site will be outside a predetermined range absent the altering;

wherein the interrogating light power is altered during a row scan of the interrogating light.

The Examiner relies on the following prior art references to show unpatentability:

Lehman	US 5,237,172	Aug. 17, 1993
Rava	US 5,874,219	Feb. 23, 1999
Bengtsson	US 6,078,390	Jun. 20, 2000

The rejections as presented by the Examiner are as follows:

1. Claims 1-5 and 18-20 stand rejected under 35 U.S.C § 103(a) as unpatentable over the combination of Bengtsson and Rava.

2. Claims 7-11 stand rejected under 35 U.S.C § 103(a) as unpatentable over the combination of Bengtsson, Rava, and Lehman.

We reverse the rejection of claims 2-5, 7-11, and 18-20. We affirm the rejection of claim 1. However, because our reasoning differs from that of the Examiner we designate our affirmance as a new ground of rejection.

DISCUSSION

The claimed invention relates to methods of scanning an array, e.g., a polynucleotide array (Specification 1; claims). Polynucleotide "arrays include features (sometimes referenced as spots or regions) of usually different sequence polynucleotides arranged in a predetermined configuration on a substrate" (Specification 1). For clarity, we direct attention to Appellants' Figures 1 and 2, which illustrate a predetermined configuration of features (16) on the face (12) of the substrate (10) (Specification 8; Figures 1 and 2). According to Appellants' Specification the features "are disposed in a pattern which defines the array" (Specification 8).

Therefore, when exposed to a sample the array will exhibit a binding pattern. The array can then

> be interrogated by observing this binding pattern by, for example, labeling all polynucleotide targets . . . in a sample with a suitable label (such as a fluorescent compound), scanning an interrogating light across the array and accurately observing the fluorescent signal from the different features of the array. Assuming that the different sequence polynucleotides were correctly deposited in accordance with the predetermined configuration, then the observed binding pattern will be indicative of the presence and/or concentration of one or more polynucleotide components of the sample.

(Specification 2.)

The array may be an addressable array wherein "different features have different predetermined locations ('address') on a substrate carrying the array" (Specification 1). More specifically, Appellants define an "addressable array" as including "any one or two dimensional arrangement of discrete regions (or 'features') bearing particular moieties (for example, different polynucleotide sequences) associated with that region and positioned at particular predetermined locations on the substrate (each such location being an 'address')" (Specification 7).

The array and the substrate on which the array is deposited are the minimum components of an "array 'package'" (Specification 7). The array package, however, may contain other components, including a housing (34) and an identifier (54). According to Appellants' Specification, the identifier may provide instructions to alter the interrogating light power of a scanning apparatus at a first site of the sites to be scanned and of a specified location on the array package (Specification 8). "The specified sites (specified by location on [the] array package 30) can be particular ones of features 16 or can be other sites on the array package 30 . . . from which, for example, unduly bright fluorescence from an adhesive might be expected, or regions off the area covered by the array . . ." (Specification 9).

Claim 1:

Appellants' claim 1 is drawn to a method. The method of claim 1 comprises three steps. Step (a) requires that an interrogating light be scanned across multiple sites on an array package. According to step (a), the array package comprises an addressable array of multiple biopolymeric features of different moieties. In addition, step (a) requires that the scanned

sites comprise multiple features of the array. Step (b) requires the signals emitted from respective scanned sites in response to the interrogating light be detected. Step (c) requires that the power of the interrogating light be decreased during the scan of a first site. According to step (c), the first site is on the array package, but is outside of the area occupied by the array.

According to the Examiner, Bengtsson teaches a method of scanning a microarray, wherein the power of the interrogating light is decreased as it scans a calibration area on the microarray (Answer 3). In this regard, we find that Bengtsson teaches a system that automatically sets its sensitivity for a new sample by first locating the microarray[1] on the sample (Bengtsson, col. 6, ll. 1-3). Specifically, Bengtsson performs a low-resolution scanning operation over the entire sample to locate the microarray (Bengtsson, col. 6, ll. 3-6). Bengtsson's system displays the results of this scanning operation as a map of the fluorescent intensity of the microarray (Bengtsson, col. 6, ll. 14-17). Once the position of the micro-array is determined, the user can then select a calibration area (Bengtsson, col. 6, ll. 23-24), calibrate the system with a low-resolution calibration step (Bengtsson, col. 2, l. 23 – col. 3, l. 14), and then proceed with a high resolution scan of the relevant area of the micro-array (Bengtsson, col. 5, l. 41 through col. 6, l. 37).

Bengtsson teaches that both the scan to locate the array and the initial calibration scan are performed with an interrogating light having decreased power. Specifically, Bengtsson teaches that the locating scan is performed by a low-resolution scan wherein the interrogating light is set, for example,

[1] According to Bengtsson, the microarray may contain "chemicals, DNA and so forth that are under study" (Bengtsson, col. 1, ll. 14-16).

to an attenuation level[2] of one-half and the detector gain is set to maximum (Bengtsson, col. 6, ll. 10-13). Similarly, Bengtsson teaches that the calibration scan is performed with an interrogating light wherein the initial settings of the attenuation (e.g. excitation signal power) and gain are half-power and maximum respectively (Bengtsson, col. 2, ll. 23-26). We find no requirement in Appellants' claim 1 that requires the interrogating light to vary during the scanning operation.

As to the requirement in Appellants' claim 1 that the first site is outside an area occupied by the array, we find that if a sample was scanned to determine the location of a microarray contained thereon as taught by Bengtsson, one would start the scan in an area outside of the area occupied by the array to facilitate the identification of the edges of the array. "When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that is was obvious under § 103." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). In our opinion, when attempting to identify a microarray's location on a sample, there are a finite number of starting points (e.g., an area outside of the microarray).

Since Bengtsson utilizes a low-resolution scan to perform this locating operation, the first site scanned, as well as the remainder of the sample,

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[2] According to Bengtsson, a variable laser attenuator controls the excitation signal power that is delivered to a sample (Bengtsson, col. 3, ll. 32-34).

would be with an interrogating light of decreased power, e.g., one-half power.

Accordingly, we find that Bengtsson expressly teaches every element of Appellants' claimed invention but for an addressable array. (See also Answer 3.)

The Examiner relies on Rava to teach an addressable array (*id.*). We find no error in the Examiner's reliance on Rava. We also note that Appellants do not dispute this teaching in Rava. Accordingly, we conclude that it would have been prima facie obvious to a person of ordinary skill in the art to modify Bengtsson's method to utilize an addressable array.

We recognize Appellants' assertion that Bengtsson does "not teach the element of [c]laim 1 in which power of the interrogating light is decreased for a first site on the array package during scanning wherein the first site is outside an area occupied by the array" (Br. 10). For the foregoing reason, we are not persuaded by Appellants' assertion.

Accordingly, we find that claim 1 would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made in view of the combination of Bengtsson and Rava. Therefore, we affirm the rejection of claim 1 under 35 U.S.C. § 103(a) as unpatentable over the combination of Bengtsson and Rava. However, because our reasoning differs from that of the Examiner we designate our affirmance as a new ground of rejection.

Claim 5:

Claim 5 is drawn to a method that comprises three steps. Step (a) requires that an interrogating light be scanned across multiple sites on an array package. According to step (a), the array package comprises an addressable array of multiple biopolymeric features of different moieties. In addition, step (a) requires that the scanned sites comprise multiple features of the array. Step (b) requires the signals emitted from respective scanned sites in response to the interrogating light be detected. Step (c) requires that the power of the interrogating light be altered for a first site on the array package during scanning based on the signal emitted from the first site, when the interrogating light initially illuminates the first site. In addition, step (c) requires that the first site is an array feature.

Bengtsson's method requires, *inter alia*, that a first scan line of a feature on a microarray is scanned. The system then determines whether an adjustment is necessary; if so, the same scan line is then rescanned and this process continues until the system is no longer saturated or a predetermined minimum power level is obtained (Bengtsson, col. 2, ll. 23-51). Simply stated, Bengtsson's method requires a low-resolution pre-scan of the elements in the microarray prior to performining a high-resolution scan of the microarray.

Appellants' claimed invention requires that "the interrogating light power is altered based on the signal emitted from the first site, when the interrogating light initially illuminates the first site" (claim 5). Appellants' Specification distinguishes between the process recited in the claim and a pre-scan, such as that taught by Bengtsson. Specifically, Appellants' Specification discloses that

> the interrogating light power may be reduced based on a determination that the emitted signal from the first site will exceed a predetermined value, or based on location of the first site. If the determination is used this can be based, for example, on the results of a pre-scan or on the signal emitted from the first site when the interrogating light initially illuminates the first site.

(Specification 4: 14-18.) The Examiner finds that

> Bengtsson teach[es] a method comprising scanning interrogating light across multiple sites of an array detecting signal from respective scanned sites emitted in response to the light and altering the power of the interrogating light for a first site which is an array feature and wherein interrogating light power is altered based on the signal emitted from the first site when the light initially illuminates the first site (i.e. scan line 301 is scanned, attenuation is adjusted (power decreased) to avoid saturation, Column 5, lines 43-47 and . . . 49-64).

(Answer 4.) What the Examiner has keyed in on is Bengtsson's pre-scanning process, which Appellants' Specification distinguishes from the process required by claim 5. The Examiner has not identified, and we do not find, a teaching in Bengtsson of a scanning process wherein the power of the interrogating light is altered based on the signal emitted from a first site, when the interrogating light initially illuminates the first site as is required by claim 5. The same is true of independent claim 18.

For the foregoing reasons we reverse the rejection of claims 2-5 and 18-20 under 35 U.S.C. § 103(a) as unpatentable over the combination of Bengtsson and Rava.

Claim 7:

Claim 7 is drawn to a method that requires four steps. Step (a) requires that prior to scanning an interrogating light across an array package, the interrogating light power is calibrated against a control signal characteristic from a light system which provides the interrogating light of a power which varies in response to the control signal characteristic. Step (b) follows step (a) and requires that an interrogating light be scanned across multiple sites on an array package comprising an addressable array of multiple biopolymeric features of different moieties. According to step (b), the scanned sites comprise multiple features of the array. Step (c) requires that the signals from respective scanned sites that are emitted in response to the interrogating light are detected. Step (d) requires that the interrogating light power is altered for a first site on the array package during the array scanning using the calibration of step (a), based on either (i) the location of the first site or (ii) a determination that the emitted signal from the first site will be outside a predetermined range absent the alteration. In addition, step (d) requires that the interrogating light power is altered during a row scan of the interrogating light. We interpret this last clause of step (d) to require that the interrogating light power is altered while the row scan is being performed.

The Examiner finds that

> Bengtsson teaches a method comprising: calibrating an interrogating light power versus a control signal characteristic from a light system which provides the interrogating light of a power which varies in response to the control signal characteristic; scanning an interrogating light across multiple sites on an array package which scanned sites include multiple features of the array; detecting signals from respective scanned

> sites emitted in response to the interrogating light; and altering the interrogating light power for a first site on the array package during the scanning step . . . based on location of the first site or on a determination that the emitted signal from the first site will be outside a predetermined range absent the altering . . . .

(Answer 7.) In addition, the Examiner finds that Bengtsson teaches that "the system turns off the lasers for a fraction of time during the row scanning . . ." (*id.*). In our opinion, turning the interrogating light (e.g., laser) off during a row scan is an alteration of the power. That said, the Examiner has failed to identify, and we do not find, a teaching in Bengtsson that the power of the interrogating light is altered based on either the location of the first site, or on a determination that the emitted signal from the first site will be outside a predetermined range absent the altering as is required by claim 7. To the contrary, according to Bengtsson, "[i]f the lasers are turned on and off, the system determines if N consecutively acquired pixels are saturated in a given scan line . . ." (Bengtsson, col. 8, ll. 25-27). Stated differently, the lasers are turned on and off as part of Bengtsson's calibration step, not in response to the location of a first site, or a determination that the emitted signal will be outside of a predetermined range absent the altering (Br. 14).

For the forgoing reasons, we reverse the rejection of claims 7-11 under 35 U.S.C. § 103(a) as unpatentable over the combination of Bengtsson, Rava, and Lehman.

CONCLUSION

In summary, we reverse the rejection of claims 2-5, 7-11, and 18-20.

We affirm the rejection of claim 1. However, because our reasoning differs from that of the Examiner, we designate the affirmance of claim 1 as a new ground of rejection.

TIME PERIOD FOR RESPONSE

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b) (effective September 13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the Examiner. . . .
>
> (2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

Should the Appellant elect to prosecute further before the Examiner pursuant to 37 C.F.R. § 41.50(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the

prosecution before the Examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the Appellant elects prosecution before the Examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

AFFIRMED-IN-PART; 37 C.F.R. § 41.50(b)

Ssc:

AGILENT TECHNOLOGIES, INC.
INTELLECTUAL PROPERTY ADMINISTRATION
LEGAL DEPARTMENT, DL429
P.O. BOX 7599
LOVELAND, CO 80537-0599